procedures and survival training.

30. Further, the positioning features of E-911, even if available and reliable, would provide little, if any, assistance in the event of an emergency and might foster false expectations. PetroCom's mobile customers are boats which travel through the Gulf, and in some cases, helicopters. Boat operators and pilots are held to a higher standard of safety vigilance than is the motorist. They are responsible for operating procedures and rules of the sea and air as prescribed by the Coast Guard and the FAA. Further, the person in charge of the vessel is charged with the personal safety of the passengers, as well as the position of the vessel.

31. Currently, PetroCom routes no-charge 911 calls from any coverage area in the Gulf to the Coast Guard United States Search and Rescue Operations in New Orleans, which screens the calls and acts as a Public Safety Answer Point (PSAP).[42] PetroCom believes that its current service meets the requirements for E-911 service in the Gulf, and requests that the Commission to so declare.

VI. Universal Service

32. The Telecommunications Act of 1996 created a framework for the creation of the universal service fund ("Fund") by the

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[42] PetroCom will explore the feasibility of testing positioning technologies currently in use by the Harris County, Texas E-911 service provider to determine whether such technologies will improve PetroCom's ability to deliver enhanced safety services in conjunction with the Coast Guard Search and Rescue Operations.

Commission. The Fund is designed to support the principles of universal service, including providing low-income and rural consumers with access to telecommunications services generally available in urban areas and providing schools, health care and libraries with access to advanced telecommunications services.[43] Section 254 provides the Commission with the power to exempt a telecommunications carrier from the requirement to contribute to the fund "if the carrier's telecommunications activities are limited to such an extent that the level of such carrier's contribution to the preservation and advancement of universal service would be de minimis."[44] PetroCom, by virtue of being a telecommunications provider in the Gulf, is unable to make more than a de minimis contribution to universal service. PetroCom has no low income or rural consumers. There are no schools, libraries or public health facilities in the Gulf. Therefore, the Commission should exempt PetroCom and other Gulf telecommunications providers from the requirement to contribute to the Fund.

VII. Conclusion

The Commission is faced with a difficult task in revising rules for GMSA cellular licensing that will accommodate a number of divergent interests. PetroCom's proposals attempt to work within the framework described in the Commission's Second FNPRM while

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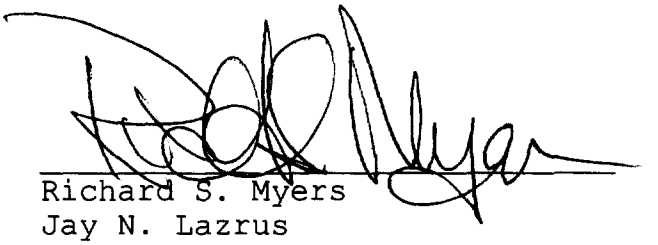
[43] See 47 U.S.C. § 254(b).

[44] 47 U.S.C. § 254(d).

preserving its rights as an existing GMSA licensee. Overall, PetroCom appreciates the Commission's efforts to revise its rules in a manner that will bring regulatory certainty to a particularly complicated area of Commission licensing procedures. PetroCom urges the Commission to take the opportunity in this proceeding to comprehensively address the issues that impact cellular operations and licensing in the Gulf of Mexico.

Respectfully submitted,
PETROLEUM COMMUNICATIONS, INC.

By: 

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July 2, 1997

ATTACHMENT A

Proposed Rules

Note: The proposed rules are presented in "redline" form. Shaded text depicts PetroCom's additions to the FCC's proposed rules contained in the Second Further Notice of Proposed Rulemaking, FCC, 97-110, released on April 16, 1997. Where applicable, text of the FCC proposed rule has been lined out.

Proposed Rules

1. Section 22.99 is amended by adding the following definition

§22.99 Definitions

* * * * *

Gulf of Mexico Service Area (GMSA). The cellular market comprising the area of the Gulf of Mexico, bounded on the West, North and East by the GMSA Coast Line. The GMSA is comprised of three zones: the Western Coastal Zone, Eastern Coastal Zone and the Exclusive Zone. The GMSA Western Coastal Zone is the geographical area within the GMSA that lies between the GMSA Coast Line and twelve (12) nautical miles, the western boundary of which area is marked by the longitudinal line having its origin at the point 26-00-20 North Latitude, 97-08-55 West Longitude and extending southward, the eastern boundary of which area is marked by the longitudinal line extending southward at 86-44-59 West Longitude. The GMSA Eastern Coastal Zone is the geographical area within the GMSA that lies between the GMSA Coast Line and twelve (12) nautical miles, the western boundary of which area is marked by the longitudinal line extending southward at 86-44-59 West Longitude, and the eastern boundary of which area is marked by the longitudinal line extending southward at 80-59-43 West Longitude. The Western Coastal Zone and Eastern Coastal Zone may be collectively referred to as the "Coastal Zone." The GMSA Exclusive Zone is the geographical area within the GMSA that lies beyond the twelve (12) nautical mile boundary of the Western Coastal Zone and the Eastern Coastal Zone extending to the limit of the U.S. Exclusive Economic Zone proclaimed in Presidential Proclamation Number 5030, 48 Fed. Reg. 10606, 1983 WL 85299 (Pres.). GMSA Coast Line, for this purpose, means a line within the Gulf of Mexico connecting the following points (geographical coordinates listed as North Latitude, West Longitude) consecutively in the order listed:

(1)	N26-00-20	W97-08-55	(27)	N29-13-41	W91-14-19
(2)	N26-14-51	W97-10-45	(28)	N29-10-05	W91-00-00
(3)	N26-29-37	W97-14-48	(29)	N29-02-36	W90-57-53
(4)	N26-45-00	W97-20-04	(30)	N29-01-59	W90-45-00
(5)	N27-00-04	W97-22-35	(31)	N29-03-21	W90-30-04
(6)	N27-15-05	W97-21-04	(32)	N29-04-35	W90-14-41
(7)	N27-30-16	W97-15-21	(33)	N29-13-06	W89-59-35
(8)	N27-45-15	W97-06-40	(34)	N29-18-12	W89-45-00
(9)	N27-59-41	W96-55-13	(35)	N29-13-06	W89-30-07
(10)	N28-14-51	W96-34-48	(36)	N29-03-29	W89-22-15
(11)	N28-29-59	W96-11-51	(37)	N28-55-36	W89-24-59
(12)	N28-44-53	W95-38-35	(38)	N29-03-05	W89-15-14
(13)	N28-59-53	W95-13-13	(39)	N28-58-50	W89-08-21
(14)	N29-15-05	W94-50-57	(40)	N29-04-18	W89-03-32
(15)	N29-29-50	W94-30-50	(41)	N29-11-20	W89-00-01

(16)	N29-35-47	W94-14-38	(42)	N29-16-12	W89-07-37
(17)	N29-43-50	W93-44-59	(43)	N29-21-50	W89-15-01
(18)	N29-46-16	W93-14-57	(44)	N29-27-47	W89-29-47
(19)	N29-37-01	W92-44-55	(45)	N29-36-30	W89-31-47
(20)	N29-32-12	W92-14-57	(46)	N29-41-57	W89-15-32
(21)	N29-33-02	W91-59-59	(47)	N29-52-00	W89-10-22
(22)	N29-27-54	W91-50-19	(48)	N30-00-01	W89-08-21
(23)	N29-30-21	W91-43-42	(49)	N30-22-34	W88-59-55
(24)	N29-30-58	W91-33-15	(50)	N30-20-31	W88-45-04
(25)	N29-23-23	W91-28-45	(51)	N30-19-08	W88-30-00
(26)	N29-19-26	W91-21-28	(52)	N30-13-30	W88-18-58
(53)	N30-14-18	W88-06-29	(79)	N28-45-19	W82-42-44
(54)	N30-13-13	W88-01-47	(80)	N28-30-01	W82-40-24
(55)	N30-13-36	W87-45-00	(81)	N28-14-57	W82-45-56
(56)	N30-16-50	W87-29-38	(82)	N28-00-04	W82-50-13
(57)	N30-18-41	W87-14-57	(83)	N27-52-01	W82-52-23
(58)	N30-23-26	W86-44-52	(84)	N27-40-08	W82-45-06
(59)	N30-22-47	W86-30-14	(85)	N27-30-04	W82-44-40
(60)	N30-20-57	W86-15-04	(86)	N27-14-49	W82-33-58
(61)	N30-16-16	W86-00-02	(87)	N26-59-57	W82-25-44
(62)	N30-08-12	W85-45-03	(88)	N26-45-07	W82-17-19
(63)	N30-00-04	W85-33-30	(89)	N26-30-04	W82-13-40
(64)	N29-44-57	W85-24-37	(90)	N26-24-53	W82-04-54
(65)	N29-40-42	W85-22-14	(91)	N26-15-00	W81-49-52
(66)	N29-33-40	W85-00-02	(92)	N26-00-15	W81-47-00
(67)	N29-42-24	W84-44-03	(93)	N25-50-04	W81-40-36
(68)	N29-53-16	W84-21-23	(94)	N25-44-53	W81-21-51
(69)	N30-04-49	W84-14-58	(95)	N25-29-53	W81-12-46
(70)	N30-04-49	W83-59-58	(96)	N25-12-01	W81-11-41
(71)	N29-56-53	W83-45-06	(97)	N25-01-48	W81-00-00
(72)	N29-44-49	W83-34-26	(98)	N24-45-09	W81-00-00
(73)	N29-39-08	W83-24-43	(99)	N24-47-15	W81-27-28
(74)	N29-31-53	W83-25-17	(100)	N24-41-15	W81-44-59
(75)	N29-24-16	W83-15-05	(101)	N24-31-54	W81-51-32
(76)	N29-07-38	W83-03-54	(102)	N24-32-34	W81-49-40
(77)	N29-09-34	W82-50-25	(103)	N24-36-19	W81-30-00
(78)	N28-59-46	W82-46-51	(104)	N24-38-19	W81-14-56
(105)	N24-42-19	W81-00-07			

* * * * *

2. Section 22. 123 is amended by revising paragraph (g)(2) to read as follows:

* * * * *

(g) * * * *

(2) Request an authorization for facilities that would expand the cellular geographic service area (CGSA) of an existing cellular system into unserved area, unless the proposed expansion would be into unserved area where the licensee applying has, on the date the filing is received, the exclusive right to expand or modify its CGSA pursuant to §22.947 or §22.948;

* * * * *

3. Section 22.131 is amended by revising paragraph (d)(2)(iv) to read as follows:

§22.131 Procedures for mutually exclusive applications.

* * * * *

(d) * * *

(2) * * *

(iv) Any application to expand the CGSA of a cellular system (as defined in §22.911) into unserved area, unless the proposed expansion would be into unserved area where the licensee applying has, on the filing date, the exclusive right to expand or modify its CGSA pursuant to §22.947 or §22.948.

4. Section 22.911 is amended by adding new paragraph (a)(3), renumbering existing paragraphs (a)(3) through (a)(6) as (a)(4) through (a)(7), adding new paragraph (c)(4), removing the Note that follows paragraph (a)(6), and adding new paragraphs (f) and (g) as follows:

§22.911 Cellular geographic service area.

* * * * *

(a) * * *

(3) For cellular systems in MSAs and RSAs other than the GMSA, the distance from a cell transmitting antenna located within 35 miles of the GMSA coast line (as defined in §22.99) to its SAB along each cardinal radial shall be calculated using the formula in §22.911(a)(2) and then, for that portion of the SAB so calculated does not extend into the GMSA, the SAB shall be re-calculated using the formula in §22.911(a)(1).

(c) * * *

of the extending system.

* * * * *

(f) The FCC will accept applications from GMSA licensees to serve the GMSA from land-based sites outside the Coast Line (as defined in §22.99), and from other MSA and RSA licensees to provide service from water-based sites, under the following conditions.

(1) A GMSA licensee may file applications for land-based transmitters to serve the GMSA under the following conditions: (i) the signal strength of the GMSA licensee's transmitter over served area (as opposed to unserved area) of the incumbent land-based carrier up to the GMSA Coast Line (as defined in §22.99) must at all times be adjusted such that the GMSA licensee's proposed system does not capture any roaming or subscriber traffic of the incumbent land-based carrier; and (ii) upon reasonable written request of the incumbent land-based carrier, the GMSA licensee must make actual measurements and adjustments in order to demonstrate compliance with the signal strength requirement above and provide such a demonstration in writing to the incumbent carrier no later than 60 days after the request is made.

(2) A land-based cellular MSA or RSA licensee may file applications for water-based transmitters to serve areas in the GMSA Coastal Zones under the following conditions: (i) the signal strength of the land carrier's water-based transmitter over served area (as opposed to unserved area) of the incumbent GMSA licensee must at all times be adjusted such that the land carrier's system does not capture roaming or subscriber traffic of the incumbent GMSA licensee; and (ii) upon reasonable written request of the incumbent GMSA licensee, the land-based carrier must make actual measurements and adjustments in order to demonstrate compliance with the signal strength requirement above and provide such a demonstration in writing to the incumbent GMSA licensee no later than 60 days after the request is made.

(g) In the event that a GMSA licensee deactivates a water-based site which was serving an area within a GMSA Coastal Zone, any other licensee may file an application to serve such vacated on a secondary basis unless and until the GMSA licensee reactivates one or more new sites on land or in water to provide service to that area, at which time the other licensee shall discontinue service absent the consent of the GMSA licensee.

5. Section 22.912 is amended by adding additional sentences to paragraphs (a), (b) and (c), to read as follows:

§22.912 Service area boundary extensions

* * * * *

(a) * * * Notwithstanding the foregoing, SABs may not extend into the channel block A GMSA Eastern Coastal Zone (unless the channel block A GMSA licensee consents to the extension)

until [insert expiration date of additional 3-year build-out period for channel block A GMSA licensee] .

(b) * * * Except as restricted in paragraph (d) of this section, licensees of the first authorized cellular systems in the GMSA may allow SAB extensions from the adjacent market system on the same channel block into their CGSA and/or unserved area in the GMSA, other than in the GMSA Coastal Zone, during the term of their GMSA cellular system authorizations.

(c) * * * Except as restricted in paragraph (d) of this section, licensees of the first authorized cellular systems in the GMSA that also are the applicant or licensee on the same channel block in the adjacent market may allow or propose SAB extensions from their adjacent markets system into their CGSA and/or unserved area in the GMSA, other than in the GMSA Coastal Zone, during the term of their GMSA cellular system authorization.

6. A new Section 22.948 is added as follows:

§22.948 Exclusive right to expand or modify CGSA within the GMSA.

The licensee of the first authorized cellular system on each channel block in the Gulf of Mexico Service Area (GMSA) is afforded, for the full term of its authorization, an exclusive right to expand or modify its CGSA anywhere within the GMSA, other than within the GMSA Coastal Zones, except as permitted by §22.911(g), and except further that the GMSA licensee on channel block A shall also have the exclusive right to expand or modify its CGSA within the Eastern Coastal Zone until [insert expiration date of additional 3-year build-out period for channel block A GMSA licensee] .

(a) Except as provided in paragraph (b) of this section, the FCC does not accept applications for authority to operate a new cellular system in any unserved area in the GMSA, other than unserved area within the GMSA Coastal Zone.

(b) During the term of its authorization, the licensee of the first authorized cellular system on each channel block in the GMSA may enter into contracts with eligible parties, allowing such parties to apply (FCC Form 600) for a new cellular system on that channel block in any area within the GMSA, other than unserved area in the GMSA Coastal Zone. The FCC may grant such applications if they are in compliance with the rules in this part.

(1) The contracts must define the CGSA of the subsequent cellular system in accordance with §22.911, including any expansion rights ceded. If not exercised, any such expansion rights terminate when the authorization of the first cellular system expires.

(2) The license term of the first authorized cellular system on each cannel block in the GMSA is not extended or affected in any way by the initial authorization of any subsequent cellular systems pursuant to paragraph (b) of this section.

(3) The FCC will accept applications for assignment of authorization or consent to transfer of control of the GMSA systems.

7. Section 20.11 is amended by adding a new paragraph, as follows:

§ 20.11 Interconnection to facilities of local exchange carriers.

* * * * *

(d) Licensees in the Cellular Radiotelephone Service authorized to serve the Gulf of Mexico Service Area shall not be deemed "interexchange" carriers for the purpose of interconnection with local exchange carriers.

ATTACHMENT B

Darby Report

Competition in Wireless Telecom Services in the Gulf of Mexico

Statement of

Dr. Larry F. Darby
Darby Associates -- Washington, DC

Prepared for

Petroleum Communications, Inc.

In the Matter of Cellular Service and Other Commercial Services in the Gulf of Mexico
WT Docket No. 97-112

July 2, 1997

INTRODUCTION.

The Federal Communications Commission recently invited comment on several matters related to markets for mobile service in the Gulf of Mexico Service Area (GMSA).[1] Among other things, the Commission a) specifically requested parties' views on the extent to which demand for wireless services in the GMSA is or will be sufficient to justify granting additional licenses to serve the area[2], and b) specifically charged advocates for licensing other commercial mobile radio services in the GMSA to submit with their proposals an analysis of the demand for such service.[3] The Commission determined to make available additional wireless licenses for providing PCS services in the Gulf of Mexico, only after a showing of the sufficiency of market demand in that submarket to warrant providing for additional capacity.

This statement responds to the first charge noted above and addresses the general question of the adequacy of demand to warrant issuing additional licenses. We will set forth a framework for structuring and analyzing available market information -- and the relevant information that may be forthcoming from more specific demand studies performed and submitted on behalf of advocates -- in the context of relevant and applicable theories of industrial organization and public policy. The purpose is to provide a framework and otherwise to assist the Commission to determine the sufficiency of capacity provided by current licensees -- or the need for additional licensees --to service demand for wireless telecommunications services in the Gulf of Mexico.

In what follows we shall a) recast the Commission's question about the adequacy of current supply to permit use of a well-known and commonly used analytical framework for analyzing markets, b) fill in the analytical framework, so far as possible, with available data

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[1] In the Matter of Cellular Service and Other Commercial Mobile Services in the Gulf of Mexico (WT Docket No. 97-112) and Amendment of Part 22 of the Commission's Rules to Provide for Filing and Processing of Applications for Unserved Areas in the Cellular Service and to Modify Other Rules (CC Docket No. 90-6). Hereinafter, Cellular Services in the Gulf of Mexico.

[2] Cellular Services in the Gulf of Mexico, p. 24.

[3] Cellular Services in the Gulf of Mexico, p. 26.

describing the wireless market in the Gulf of Mexico, c) report on a review of some of the relevant economics literature on the impact of potential entry and liberalized entry conditions, and d) discuss briefly some of the potential effects of licensing additional carriers authorized to serve the GMSA.

SUMMARY AND CONCLUSIONS

We conclude that currently licensed and duly authorized capacity, including incumbent suppliers in the GMSA and firms that are licensed to provide service there, is likely to be sufficient to meet reasonably anticipated growth in demand at rates and with service quality dimensions that reflect an effectively competitive marketplace.

We rely on the well-known structure-conduct-performance (SCP) framework for analyzing the state of competition in the wireless telecom market in the GMSA and analyze the extent to which the SCP model indicates the need for additional capacity; the need for additional licensees and, more generally, the workability of competition in the market as currently structured.

The structure of the supply side of the market appears, on the basis of available data, to be consistent with the conditions necessary to assure "workable" or "effective" competition. There are several firms, using a variety of technologies, now serving the GMSA market -- a market that is growing modestly and with clear limits on future growth. There is no evidence of significant economic barriers to entry of new firms -- scale economies appear to modest relative to the size of the market, there are no absolute cost barriers to entry, and no compelling brand loyalties. Several firms and technologies are currently licensed, but not built, thereby making potential entry a constraint on the behavior of incumbent firms.

Most of the available evidence relates to market structure. There is, however, some anecdotal evidence on the conduct of wireless firms in the region and limited information from which overall performance may be inferred. The Commission has requested proponents of additional licenses to provide analyses of demand for such services and has, thereby, set in motion a process that will be helpful in producing more detailed information on both the conduct and performance of GMSA incumbents. The Commission can readily analyze the results of such studies, as they become available, in the SCP framework set forth here.

The conduct of firms now licensed indicates a responsiveness to the needs of users; independent action on the part of suppliers; and, generally, pricing and service policies in the marketplace that generally track those associated with effective competition among a small number sellers of differentiated services. There is no evidence available of predatory, exclusionary or other anticompetitive behavior to support a case for increasing the number of potential competitors into the market.

The market performance of firms in the sector is also consistent with expectations of an effectively competitive marketplace. There are no indications of excess profits or monopoly rents being accrued. Margins of the cellular carriers appear to be normal in one case and probably at less than normal in another. Since the bulk of traffic is generated by sophisticated or large users --

principally large integrated oil and gas companies, we can surmise that any inadequacy of performance of firms in the Gulf would be a matter of public record. While, we have found no such evidence, the Commission will be able to test our tentative conclusion when the results of the Commission-solicited demand studies are available.

Since the Commission's inquiry focuses on the necessity, or desirability, of issuing new licenses to serve the GMSA we review current entry conditions and find only modest entry barriers and, more importantly, that there are checks on incumbent behavior from the existence of actual competitors as well as potential entrants who are licensed, but not now providing service.

Finally, we tentatively explore some possible consequences of increasing the number of licensees. We find that increasing the number of licensees will not necessarily improve the economic performance of the sector and may, according to some recent work in economic theory, actually diminish performance.

Thus, we have found no clear basis, in either economic theory or in the facts available to us at this time, for concluding that an increase in the number of wireless licensees and potential entrants will lead to substantial improvement in market performance and user welfare among wireless telecommunications services users in the GMSA. Further, there is some risk that granting additional licenses to serve the market will actually reduce the expected economic performance of the wireless market in the GMSA.

FRAMEWORK FOR ANALYSIS

The Commission solicited comments on the question: "...whether sufficient demand exists to justify an extension of broadband and narrowband PCS services into the Gulf of Mexico."[4] This question clearly turns on the meaning of "sufficient demand". But, "sufficient demand" has meaning only in a particular frame of reference and can only be defined with respect to some goal or objective.

So far as we can determine, "sufficiency of demand to warrant licensing additional capacity" is not a clearly defined legal or economic standard in the literature of regulatory law and economics.[5] But, a dual or complementary notion -- the extent to which actual and potential capacity to supply wireless services in the GMSA, and output of wireless services, is sufficient to meet current and anticipated demand -- complies more closely with traditional economic analyses of markets. This formulation, while more suitable than the first, still leaves us to specify context or define the meaning of the term "sufficiency of actual and potential capacity".

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[4] Cellular Services in the Gulf of Mexico, pp, 24-5.

[5] We note that the Commission has given proponents of capacity expansion the burden of showing need on the basis of demand (among other things): "Proposals for licensing of additional services in the Gulf should include an analysis of demand for such service..." Cellular Services in the Gulf of Mexico, p. 26. We look forward to analyzing those studies when they are available. Meanwhile we can only surmise the likely results on the basis of the impressionistic evidence now available.

Since, the notion of sufficient capacity is not fully explored or specifically defined in the literature, a straightforward working definition adequate for present purposes must be constructed. We suggest the following as a working definition to provide the basis for testing the sufficiency of actual and potential capacity (and inferentially the sufficiency of demand to warrant licensing additional suppliers):

> Supply and potential supply of services from currently licensed producers of wireless service in the GMSA is sufficient, if it ensures effective competition. That is, supply is sufficient, if output in the GMSA by incumbents and currently licensed firms is likely to be expanded *para passu* with growth in market demand, and with quality services being made available at rates reflecting underlying economic costs of production.

There are obviously several ways to express this condition of sufficiency. The one expressed here permits focusing on the current adequacy of competitive forces in this submarket in the absence of additional licenses issued by the Commission. Thus, in essence what we are proposing is that the test stated by the Commission -- "...whether sufficient demand exists to justify an extension of broadband and narrowband PCS services into the Gulf of Mexico."-- should be evaluated by considering whether and to what extent competition will be "workable" or "effective" in the absence of issuance of additional broadband and narrowband PCS licenses to serve the GMSA.

Such a construction of the Commission's inquiry will permit the question to be addressed in the context of mainstream economic analysis, while also providing as a framework for incorporating additional information on demand for services in the GMSA as it becomes available in response to the Commission's request.

WORKABLE OR EFFECTIVE COMPETITION

The literature on industrial organization and competition policy has long recognized the hazards of using the model of perfect competition as a standard for judging the adequacy or sufficiency of imperfectly competitive market structures; and, of comparing the market performance of firms in the real world with the theoretical results of a perfectly competitive, but idealized, marketplace. "Perfect" competition is not attainable. The standard, for competition policy purposes, set forth by practical minded economists contemplates a marketplace in which rivalry among firms yields a degree of competition that is deemed to be "effective" or "workable".[6]

In what follows we will pull together available data about market conditions in the GMSA and put them a framework permitting analysis and judgment about the effectiveness of market

[6] See John M. Clark, "Toward a Concept of Workable Competition", American Economic Review, v. 30, pp. 241-256 (1940); Joe S. Bain, Industrial Organization, second edition, (New York: Wiley, 1968); Stephen H. Sosnick, "A Criticism of Concepts of Workable Competition", Quarterly Journal of Economics, v. 72, (1958), pp. 380-423; William G. Shepherd, The Economics of Industrial Organization, Prentice Hall, Upper Saddle River, New Jersey, (1977), pp. 8, 17-19, 85 ff.

competition in absence of additional PCS licensees.

STRUCTURE--CONDUCT--PERFORMANCE FRAMEWORK

Economists have in the past frequently analyzed markets using a framework with three distinct, but related parts: a) market structure, b) market conduct and c) market performance.[7] Market structure pertains to the key elements of the economic environment within which firms operate. Market conduct refers to the behavior and actions of firms, including how and what decisions are made. Market performance is the bottom line and is measured in ways that reflect the extent to which firms' behavior contributes to economic welfare.

The theory underlying the structure--conduct--performance (SCP) framework is that market structure influences market conduct; that market conduct influences market performance; and, that performance is what counts to the public.[8] The structure of the market will constrain and incent certain kinds of conduct by firms and such conduct taken together for all firms will determine the performance of the market as measured by selected variables that economists have determined are useful indicators of economic welfare.

Several formulations of the SCP framework have been utilized in the analysis of different industries and markets. The accompanying chart suggests what might be regarded as a representative, if not necessarily , consensus view of the key elements of the SCP framework as it relates to the requirements of effective competition.[9]

As elements of market structure, the chart highlights the importance, of the number of firms; the absence of a dominant firm; the absence of barriers to entry; and the existence of (no more than) moderate quality differentials among competitors' services. With respect to market conduct, the tests for effective competition all relate to the presence of competitive behavior and the absence of practices antithetical to sustainable competition in the marketplace. Performance characteristics relate to the absence of monopoly profits (i.e., prices that are too high relative to costs) and the long term responsiveness of suppliers to user needs for new and improved services.

In the following sections we shall adduce available information and attempt to interpret it in this SCP framework. The goal is to support an assessment of the effectiveness of competition among wireless telecommunications services providers in the GMSA. We note at the outset that

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[7] The framework was spelled out in some detail in Bain's, Industrial Organization. The framework has been both widely utilized and criticized since. A good, recent summary and critique is reported in Paul R. Ferguson and Glenys J. Ferguson, Industrial Economics: Issues and Perspectives, 2nd ed., New York University Press, NY, NY, especially Chapter 2, "the Structure--Conduct--Performance Paradigm", pp. 13-37. There is a good discussion here of critiques, extensions and improvements to the SCP approach, as well as comprehensive references to the literature. (Hereinafter, Industrial Economics).

[8] Extensions of the basic theory also permit analysis of the impact of market conduct and market performance on the structure of the market, thereby making structure endogenously determined.

[9] Adapted by Ferguson and Ferguson from Sosnick, "Critiques of Workable Competition". See Industrial Economics, p. 30.

our analysis will not be fully informed by all the data that might be desired. The information on market structure is reasonably definitive. There is only anecdotal evidence available on market conduct and performance. However the Commission might reasonably anticipate submission of more data in response to its request for studies of demand in the GMSA. Meanwhile, we shall mine the available data.

Selected Characteristics of Effective Competition

Market Structure

1. Appreciable number of firms with no single firm dominant;
2. Moderate quality differentials that are sensitive to price changes;
3. No artificial barriers to entry or exit; and,
4. Reasonable information flows.

Market Conduct

1. No collusion; active rivalry among firms;
2. No unfair, exclusionary or predatory behavior; and,
3. No misleading promotional activity.

Market Performance

1. Productive and allocative efficiency;
2. Promotional expenses kept to reasonable level;
3. Profits are normal and sufficient to reward investment and encourage innovation; and,
4. Firms are responsive to opportunities to improve services and processes.

General Structure of the Wireless Market in the GOM. Several different elements of market structure -- broadly speaking the economic environment within which sellers operate -- have been cited and their influence estimated in different markets.[10] Not all structural features have relevance in individual markets. As indicated above, the key elements involve the number of actual and potential choices users have and rivalry among those providers.

The principal users of wireless telecommunications in the GMSA can be divided into two classes -- those related to various activities of energy companies (exploration, drilling,

[10] McKie, in a standard and frequently cited work on the subject, notes twenty different elements of market structure that may be instrumental in ways that industrial organization economists care about. See, James W. McKie, "Market Structure and Function: Performance versus Behavior", in James W. Markham and G.F. Papanek (eds), Industrial Organization and Economic Development: Essays in Honor of E.S. Mason, (Boston, Mass.: Houghton Mifflin, 1970)

Classes of Communications Use and Users in the GMSA

Fixed Communications Users

Segment	Activity	Communications Needs
Production	Extracts and meters oil and gas from fixed production platforms	Voice and data for reports, supply orders, and production data
Pipelines	Collection and delivery of fuel from platforms to shore	Voice and Data for operations and metering

Mobile Communications Users

Oil Field Services	Full service (re)suppliers: divers, crews and support	Voice, data and fax for management of fleets; resupply mobile/portable telecoms.
Exploration	Conduct geophysical, echo ranges	Transmit seismographic data, engineering studies, voice traffic
Exploration	Drilling based on exploration data	Voice for logistics support and drill logging
Construction	Construct/maintain platforms/pipelines; salvage platforms	Voice, fax and data to support operation and logistics

construction, production, pipelines and so forth) and nonenergy-related markets (various marine activities by fishing boats, government agencies and shipping or pleasure craft). Most of the revenue (over 90%) is generated by users in the oil and gas industry. These users utilize services between fixed locations and/or mobile units. Most of the revenue in the GMSA, over 90% according to our best estimate, is derived from fixed microwave service.[11] Most of the large, integrated energy companies in the Gulf have invested substantially in private microwave networks linking production platforms to each other and to shore. These fixed networks provide a full range of point to point services for platform and pipeline operations. Thus, fixed point to point microwave systems are complemented by mobile point to multipoint systems utilizing cellular,

[11] See, Spears & Associates, The Offshore Gulf Communications Market in the Petroleum Industry, February, 1990, p. 16. (Spears Study) This study was commissioned by Petroleum Communications, Inc. to assess the Gulf Market and the Company's performance in it. While this study is now seven years old, it is still the best source available to us for much of the information needed to assess this market. A copy of the Executive Summary is submitted as Appendix A to this report.

SMR and satellite licenses and technologies. Most of the oil and gas companies use cellular, but principally as a back-up or emergency service or for "special" communications needs.

Companies that provide services to oil and gas companies in the Gulf -- contractors, suppliers, construction companies and others -- rely less on fixed microwave (about 10% by monthly hours of traffic) and more on cellular and satellite.[12]

The universe of major market segments of wireless communications users in the GMSA is summed up in the accompanying chart (Classes of Telecommunications Uses and Users in the GMSA)

Service Providers. The supply of wireless telecommunications services in the GMSA has several dimensions of importance to the operation of the market There are several key classifications: by type of technology; by type of service; by principal customer; by identity of ownership; and, the type of equipment used. These considerations are reflected and summed up in the table following. There are four basic types of wireless technologies used in the GOM -- Cellular (two carriers); Specialized Mobile Radio (three providers -- two common carriers and one private system); numerous terrestrial microwave (three common carriers); and C or Ku Band satellite service (two providers).

In 1995 there were 53 private microwave licenses in operation in the GMSA. These operators provided 743 private microwave paths, while another 63 paths were provided on a common carrier basis. Since a single path can provide hundreds of circuits, a recent study estimated that there are over 10,000 separate microwave circuits serving the area. These private microwave systems were owned and operated by the major oil and gas companies and are joined by four common carriers using fixed microwave systems.[13]

The two cellular providers are PetroCom and Coastel. PetroCom is the market leader with over 50 % share of the GOM cellular market. PetroCom provides a premium service and commands a price premium relative to the services provided by Coastel. Coastel has positioned itself as the low cost provider for companies willing and able to rely on a lower level of service quality and reliability. Coastel uses microwave backhaul, while PetroCom uses higher cost, more reliable C-Band satellite backhaul services. The evidence on cross-elasticities is limited, but the

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[12] Offshore Gulf Communications Market in the Petroleum Industry , p. 16.

[13] The companies include: Chevron USA, Inc.; Shell Communications, Inc.; Amoco Production Company, Exxon Communications Company; Mobil Oil Telecom Company; Pennzoil Exploration and Production Company, Arco Communications Company; Columbia Gas Development Corporation, Diamond Shamrock Exploration Corporation; Centex Oil and Gas Company; Forest Oil Corporation; Conoco Offshore Production; Amerada Hess Communications Corporation, Kerr-McGee Corporation; Marathon Oil Company; Texaco Communications, Inc.; Union Tenneco Microwave System; and others. In addition to these private microwave systems, there are four common carriers using microwave technology -- IWL, SolaCom, DataCom and Shell Offshore Services Company (SOSCO).

Selected Characteristics of Wireless Service Providers in the GMSA

TelCom Supplier	PetroCom	Coastel	IWL	SolaCom	DataCom	SOSCO	Other
Address	Houston / New Orleans	Houston / New Orleans / State	Houston / Lafayette	Lafayette -	Lafayette - Other	Houston / New Orleans	
Services Provided	Cellular	Cellular	Microwave	Microwave	Microwave	Microwave	
	SMR				SMR		
	Sat-Com C+Ku		SatCom KU			WCS	
			C-Lec switched IXC		IXC	C-Lec switched IXC	
			Engineering Service	Engineering Service	Engineering Service	Engineering Service	
	CDPD Data		Technical Service	Technical Service	Technical Service	Technical Service	
Status	Private	Private	Public	Private	Private	Subsidiary of Shell Oil	
Frequency Used							
Technology	Analog	Analog	Digital	Digital	Digital	Digital	
Equipment Used	Motorola	Hughes	Alcatel	Motorola		Alcatel	
	Eagle		Motorola			Motorola	
	GE Americom		Various Lines	Various Lines	Various Lines		

skimpy pricing data available suggests that moderate price differences -- reflecting service differentials -- are sustainable and consistent with stable market shares.[14]

Some users in the GMSA market take service from satellite providers American Mobile Satellite (AMSC) and from ComSat. The amount is unknown to us, but the Spears study cited above indicated that satellite use was accounted for mainly by the service sector, which also depended heavily on cellular providers.[15] There are also VHF ship-to-shore radio services provided by Maritel, Inc. as well as some services using the UHF frequencies. We have no estimates of the size of this traffic stream, but believe it to be very small.

The total market for communications services in the GMSA is difficult to estimate -- given the private nature of most of the suppliers. Our best estimate, based on limited, anecdotal evidence, is that the total offshore market in the Gulf is generating about $80 million in annual revenue from commercial systems, with private network systems owned and operated by the major oil and gas companies adding approximately the same amount of value per year. Of the $80 million commercial revenue base, more than half is generated by microwave systems, with the remaining $35 million or so divided among two cellular carriers, satellite carriers, two way radio services and others.[16]

Types of Services and Quality Differentials. The different services made available reflect the capabilities of the technology and user needs expressed in the marketplace. To our knowledge, there are no specific demand studies available to quantify the cross-elasticities among different services and firms. However, limited information available indicates that there is both intramodal and intermodal substitution among some classes of use and users. Intramodal (between microwave systems and between cellular systems) substitution is relatively more common , but users have also switched from one mode to another, depending on user needs, the differences in service qualities and relative rate differentials. The accompanying chart sets forth a comparison of the service characteristics of alternative telecommunications technologies used in the GMSA.

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[14] There is almost no information available about price elasticities and cross elasticities of demand. Moreover, the special characteristics of demand (uses and users) in the Gulf market undermine attempts to draw inferences from data for onshore, inland markets. If and when the Commission receives demand studies in response to its requests from proponents of additional licenses, the record should permit more definition of user perceptions of these differences.

[15] The Spears Report indicated that the service sector accounted for seven percent of the total in the Gulf (versus 93% for producer traffic). Of the seven percent service sector traffic, 36% was carried by satellite and 57% by cellular.

[16] We emphasize again the tentative and impressionistic nature of these estimates. They are derived from bits and pieces of information from different sources. Where possible, we have confirmed the estimates with knowledgeable sources and so far as we can tell, there is no better public estimate available.

Comparison of Alternative GMSA Communications Technologies

	Cell Telephone	Microwave	DRT	Satellite (Ku)	2-way Radio
Reliability	High	Moderate	Low	Moderate	Low
Voice Quality	High	Moderate	Low	High	Low
Telco Access	Yes	Yes	Yes	Yes	No
Range	Moderate	Limited	Limited	Excellent	Limited
Portability	Yes	No	No	No	Yes
Airtime Cost	Moderate	Low	Low	High	None
License Req.	No	Yes	Yes	Yes	Yes
Hardware Cost	Low	High	Moderate	High	Low
Maintenance	Low	Moderate	Very high	Low	Low

Conditions of entry. Of the several elements of market structure, conditions of entry into the market by outsiders has in recent years assumed primary importance as a force limiting the market discretion of incumbent firms and, therefore, a key determinant of the performance of firms in imperfectly competitive market settings. Where barriers to entry are low, and outsiders can commence production without incurring substantial costs not incurred by incumbents, the mere possibility of entry provides a competitive check on the conduct of incumbents and their ability to behave in anticompetitive ways. One analyst summarized the importance of entry as follows:

> If conditions of entry into an industry are free and easy, then, even though there may be only a few firms actually in the market, they may be compelled to perform well, in terms of productive, dynamic and allocative efficiency.[17]

[17] John Vickers, "Strategic Competition Among the Few", in Readings in Microeconomics, Tim Jenkinson, ed. (Oxford: Oxford University Press, 1996) p. 19. The disciplinary effect of potential entry on the behavior of incumbents has been expressed in its purest form under the doctrine of "contestability". The key elements of contestability theory are spelled out by William Baumol, "Contestable Markets: An Uprising in the Theory of Industrial Structure", American Economic Review, v. 72, pp.1-15. The full theory is developed in William Baumol, John Panzar and Robert Willig, Contestable Markets and the Theory of Industry Structure, (New York: Harcourt Brace Johanovich, 1982). While we believe the necessary conditions for contestable markets are not met in the market for wireless services in the GMSA, or for that matter in most other markets, the theory of contestable markets provides a potent reminder of the power of the threat of entry in restricting potential anticompetitive pricing behavior of incumbent firms -- in the GMSA wireless market and elsewhere.

As set out and discussed above, there are several companies, using different technologies, now providing wireless services in the GMSA. The question arises as to whether there are substantial barriers to entry of new capacity and new competitors. It is helpful to think of two types of entry barriers -- regulatory barriers to entry and economic barriers to entry.

Regulatory barriers arise from restrictions imposed by government agencies on the number, type and ownership of radio licenses. The Commission has issued numerous licenses entitling the owners to provide wireless services in the GMSA. Some of these licenses have been constructed and the owners are now providing services under their authority. Other licensees have not constructed systems and are not providing services. There are several potential entrants into this market and some will provide some services to some users that will be reasonably good substitutes for services provided by incumbent providers of cellular and microwave services in the GMSA.

Wireless communications services (WCS) licenses recently obtained by Shell Offshore Services Company (SOSCO) for fixed voice/data services will be cross-elastic with incumbent services in several applications. In addition satellite systems -- Iridium, Globalstar, Teledesic, Sky Bridge, OrbCom, ICO and perhaps others -- will be available to provide service in the next decade.[18] The design of some of these systems, and their planned market focus, may make them either complementary to, or competitive with, terrestrial wireless services in the Gulf. There is little doubt that for some applications and some users -- especially the larger accounts -- satellites will provide an alternative to terrestrial wireless services. Finally, we note that Specialized Mobile Radio (SMR) service is presently licensed on a site by site basis in the GMSA. Further, the Commission currently licenses 900 MHz on a wide area basis and has proposed wide area licensing for 800 MHz as well.

These facts indicate there is a significant amount of new potentially competitive wireless capacity already licensed by the Commission. The existence of these licenses, even though they are not constructed, is providing and will provide some discipline on incumbent behavior. The threat of new entry also carries with it the prospect of additional market risk in the future.

In the absence of regulatory barriers posed by the need to acquire radio licenses, it is worthwhile to explore the extent to which there may be economic barriers to entry. Economic barriers may be of several types.[19] The most commonly referenced pertain to the size of fixed costs and economies of scale; the success of product differentiation by firms in establishing brand

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[18] For a discussion of the plans and profiles of potential satellite competitors, see Quentin Hardy, "Motorola Plans Another Satellite System -- Celestri Network to Deliver High Speed Data, Video", Wall Street Journal, June 24, 1997, p. A-3 and A-4.

[19] For an excellent and up-to-date discussion of entry barriers see Stephen Martin, Advanced Industrial Economics, chapter 7, "Market Structure, Entry and Exit", (Cambridge, Massachusetts: Blackwell Publishers, 1993) and the extensive list of references cited there.

loyalties; and absolute cost advantages enjoyed by incumbents.[20] The essence of economic barriers to entry is captured by a comparison of the costs of production of an incumbent and the costs to an entrant. If entrants face higher costs -- from any source -- than incumbents, for comparable outputs, the difference is a proxy measure for economic barriers to entry.[21]

From the limited evidence available to us, there appear to be no substantial economic entry barriers. A new entrant would find some limits on the amount of space available (on platforms) for cellular equipment, but that constraint is in principle similar to similar conditions found with onshore systems in congested areas.[22] Economic barriers of the sort traditionally encountered in

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[20] See, Martin, Advanced Industrial Economics, pp. 173-191, for a full discussion of these and other barriers cited by theorists and those engaged in empirical studies of specific industries.

[21] Christian von Wiezsacker combines consideration of cost differences with consideration of the impact on social welfare as indicia of entry barriers: "...a barrier to entry is a cost of producing which must be borne by a firm which seeks to enter an industry but is not borne by firms already in the industry and which implies a distortion in the allocation of resources from a social point of view." Christian C. von Weizsacker, "A Welfare Analysis of Barriers to Entry", Bell Journal of Economics, 11 (2), 1980, p. 400.

[22] Public information about the Gulf Market is generally sparse and anecdotal. It is informative to report a summary of useful information contained in an "S-1" registration filing recently made with the Securities Exchange Commission by IWL Communication, Inc., a communications common carrier doing business in the GMSA (hereinafter IWL). The following is drawn from the S-1 filing.

The Company delivers comprehensive communications service to its customers by utilizing a broad range of analog and digital technologies, including satellite, microwave radio, conventional two-way radio and fiber optic cable. The core business of IWL is provision of communications services to customers in the oil and gas business such as Amoco, British Gas, Chevron, Conoco, Exxon, and Shell. (p. 4) Customers in the oil and gas business have accounted for substantially all of the companies sales in FY 1995 and 1996. In describing its business, IWL stated:

1. "The company's business and results of operations are substantially dependent on sales to oil and gas customers and the loss of one or more of these customers, or a significant reduction in sales to them, could have a material adverse effect on the company's financial condition, results of operations and cash flow...the Company's operations could be significantly impacted by market forces affecting the oil and gas industry as a whole. There can be no assurance that the oil and gas industry will not suffer a significant downturn, nor can there be any assurance that the Company will remain profitable under such conditions." (p. 7)
2. "The nature of the Company's competition is diverse due to the breadth of the services offered by the Company and the geographic regions in which such services are provided. The Company is subject to intense competition with respect to each of its individual service offerings." (p. 8)
3. The Company's annual and quarterly operating results have varied significantly in the past and are expected to vary significantly in the future. These fluctuations in operating results are caused by a number of factors, including changes in the Company's services and product mix, levels of product resales, adverse weather conditions in customer locations, the degree to which the company encounters competition in existing or target markets, general economic conditions, the volume and timing of orders received during the period, sales and marketing expenses related to entering new markets, the timing of new product or service introductions by the Company or its competitors and changes in billing rates by the Company or its competitors. (p. 11)
4. "Through various agreements, the Company has access to capacity from other microwave systems owned by carriers throughout the Texas and Louisiana Gulf Coast region. In order to provide wireless mobile services, the Company owns various radio systems that provide two-way voice communications and has obtained 35 FCC licenses with approximately 320 frequency pairs." (p. 30)

concentrated industries do not seem to be a factor here. While entry has been negligible in recent years, that fact seems to be a product of the ability of incumbents to provide adequate services , at reasonable rates, in a modestly growing market.

Market Conduct of Firms in the GMSA. The foregoing indicates that structural conditions are generally consistent with the requirements for effective competition. While most of the available data pertains to the structure of the market, there is anecdotal information suggesting that the market behavior of incumbents is also consistent with effective competition.

As would be expected, the different technologies are priced differentially in the GMSA just as they are in other geographic markets. Fixed microwave is the least expensive with monthly lease charges in the $1,500 to $2,500 range depending on distance. (Charges per minute are incalculable inasmuch as they vary with usage.) Cellular charges are in the $.90 to$1.25 per minute range. Satellite charges are greatest, with distribution available from INMARSAT in the $5.00-6.00 per minute of range (with discounts for volume usage aggregated over other markets). For particular types of use, there are instances of users switching traffic among technologies. For example, in the 1990 Spears Study, over one third (6 of 17) of the microwave users surveyed indicated their expectation to switch some traffic away from microwave systems; over two-thirds (18 of 25) of cellular users were switching some traffic from other technologies to cellular providers; and, almost half (11 of 21) two-way radio users were switching away from that mode to some other. Less than half the firms surveyed planned no switching of traffic from one mode to another. [23] While impressionistic, these data suggest a significant degree of substitutability among services provided by different firms using different technologies.

We have detected no indication that prices do not reflect costs or are otherwise inconsistent with the production characteristics of different technologies in use in the GMSA. The most recent available data reflecting users' views (the 1990 Spears Study) indicates that 21 of 31 respondents surveyed believed that cellular services supplied by the premium cellular services provider in the Gulf (PetroCom) were in the Excellent/Good or Satisfactory category. The ratio of Excellent/Good and Satisfactory scores to total respondents was just as good or better on other dimensions of firm behavior with the firm getting good grades on responsiveness (21 of 35), quality of people (25 of 32), selling effort (16 of 23) and overall service quality (18 of 27).[24]

Finally, the Company reported income from operations of $148,000 and $936,000 on sales of $14,860,000 and $15,794,000 in 1994 and 1995, respectively. (p. 6) These and numerous similar and related statements in the S-1 clearly impart the "flavor" of competitive markets in the GMSA and are relevant to the Commission's determination of the workability of competition as it is currently realized in that region.

[23] See Spear Study, Offshore Gulf Communications Market in the Petroleum Industry , p. 10.

[24] The first number indicates the number of respondents giving a mark of excellent/good or satisfactory, while the second is the number of respondents. See Spear Study, Offshore Gulf Communications Market in the Petroleum Industry, p. 15.